THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A grinding apparatus for grinding the working tips of hard metal inserts of rock drill bits, said grinding apparatus having a grinding machine, means for holding the rock drill bits to be ground and a support system, said support system including means to provide a feed pressure for said grinding machine during grinding, said grinding machine adapted to be equipped with a grinding pin driven by a motor to rotate about its longitudinal axis wherein the grinding cup is rotated at controlled variable speeds and the support system provides a controlled variable feed pressure.

2. A grinding apparatus according to claim 1 wherein the speed of rotation of the grinding cup and feed pressure may be varied during a grinding cycle of a working tip on a rock drill bit.

3. A grinding apparatus according to claim 1, 2 or 3 wherein the grinding cup is rotated at variable speeds from about 2200 to 6000 RPM and the support system provides a variable feed pressure up to 350 KG.

4. A grinding apparatus according to claim 1 wherein the grinding machine utilizes an electric motor capable of producing high torque over a range of RPMs, with a relatively compact size and weight.

5. A grinding apparatus according to claim 4 wherein a frequency inverter is provided between the electric motor and the electric power source.

6. A grinding apparatus according to claim, 4 or 5 wherein said electric motor is water-cooled.

7. A grinding apparatus according to claim 6 wherein a coolant may be provided to the surface of the hard metal inserts during grinding through one or more outlets in said grinding cup and said electric motor is cooled with the same coolant.

8. A grinding apparatus according to claim 1 wherein a rotation motor and bearing arrangement are provided on said support system for providing an orbital rotation to the grinding machine around the longitudinal axis of the hard metal insert.

9. A grinding apparatus according to claim 5 wherein the frequency inverter is a compact solid-state frequency inverter.

10. A grinding apparatus according to claim 1 wherein said support system includes an arm or lever system for carrying and positioning the grinding machine and said arm or lever system is journaled onto a stand.

11. A grinding apparatus according to claim 10 wherein said arm or lever system has a first arm section having a first end journaled to said stand wherein said first arm section controls the horizontal location of the grinding machine relative to the drill bit to be ground.

12. A grinding apparatus according to claim 11 wherein said arm system has a second arm section having a first end adapted to be connected to a second end of said first arm section, and wherein the second arm section controls the vertical movement of the grinding machine up and down.

13. A grinding apparatus according to claim 1 wherein said grinding apparatus has a self centering grinding machine and said support system permits movement of the grinding machine horizontally and vertically relative to the longitudinal axis of the hard metal inserts of the rock drill bit to be ground to align the grinding machine with the longitudinal axis of the hard metal insert to be ground wherein biasing means are provided on said support system to provide a biased side load substantially perpendicular to the longitudinal axis of the hard metal insert of the bit to be ground to the grinding machine or bit during grinding to maintain alignment of the grinding machine with the longitudinal axis of the hard metal insert to be ground.

14. A grinding apparatus according to claim 13 wherein said support system comprises a frame and an arm or lever system having a first arm section with a first end journaled on said frame for adjustment of said grinding machine normal to the longitudinal axis of the hard metal insert to be ground and wherein the means for providing a biased side load to said grinding machine consists of a cylinder having one end connected to said frame and the other end connected to said first arm section.

15. A grinding apparatus according to claim 14, wherein said support system includes means for providing a balance pressure when the grinding machine is not in use and feed pressure when in use.

16. A grinding apparatus according to claim 15 wherein said support system includes a second arm section.

17. A grinding apparatus according to claim 16 wherein the means for providing a balance pressure includes a cylinder connected to the second arm section.

18. A grinding apparatus according to claim 17, wherein said second arm section has an upper and lower parallel arm with a first end of each arm pivotally mounted to a front side of a first box section, a second end of each arm is pivotally connected to a back side of a second box section wherein the means for providing a balance pressure to said second arm section includes a cylinder connected to the first end of the lower arm said first end of said lower arm extending out from a pivot point at which the lower arm is connected to the first box section.

19. A grinding apparatus according to claim 13, 14, 15, 16, 17 or 18 wherein the means for holding one or more rock drill bits to be ground includes a table with one or more apertures to hold one or more rock drill bits to be ground, said table tiltably mounted within a box or frame and means to control the tilting action of said table.

20. A grinding apparatus according to claim 19 wherein the means to control the tilting action of the table consists of an arced slot provided in a side of the box, a linear actuator provided on a side of the box and having an actuator rod with a remote end of the actuator rod is connected to a side of the table through said slot wherein extension of the actuator rod will tilt the table.

21. A grinding apparatus according to claim 19 or 20 wherein means are provided to lock a bit within said aperture and means to partially release the pressure to

permit the bits to be rotated without full release of the locking means.

22. A grinding apparatus according to any one of claims 19 to 21 wherein the cylinder providing a biased side load is automatically activated when the table is tilted.

23. A control system for grinding apparatus for grinding the hard metal inserts of rock drill bits, said grinding apparatus having a grinding machine, and means to provide a feed pressure for said grinding machine during grinding, said grinding machine equipped with a grinding pin driven by a motor to rotate about its longitudinal axis, said control system having a series of interconnected control modules including an operator input panel and a programmable control card module said control system capable of monitoring and adjusting one or more operational parameters selected from the group consisting of feed pressure, grinding cup RPM and grinding time.

24. A control system according to claim 23 wherein said operator input panel permits the size and profile of the hard metal insert to be ground to be inputted to said programmable control card module.

25. A control system according to claim 23 or 24 wherein series of interconnected control modules are connected to a suitably located multi-function input/output card module that acts as a central communications hub for the all the interconnected control modules.

26. A control system according to claim 25 wherein feed pressure and grinding cup RPM are increased progressively on start up.

27. A control system according to claim 23, 24 or 25 wherein said grinding machine utilizes an electric motor capable of producing high torque over a range of RPMs, with a compact size and weight.

28. A control system according to claim 27 wherein a frequency inverter is provided between the electric motor and the electric power source.

29. A control system according to claim 28 wherein said electric motor is water-cooled.

30. A control system according to claim 29 wherein a coolant may be provided to the surface of the hard metal inserts during grinding through one or more outlets in said grinding cup and said electric motor is cooled with the same coolant.

31. A control system according to claim 23 wherein a rotation motor and bearing arrangement are provided on said support system for providing an orbital rotation to the grinding machine around the longitudinal axis of the hard metal insert.

32. A control system according to claim 31 said grinding apparatus has a self centering grinding machine and a support system that permits movement of the grinding machine horizontally and vertically relative to the longitudinal axis of the hard metal inserts of the rock drill bit to be ground to align the grinding machine with the longitudinal axis of the hard metal insert to be ground wherein biasing means are provided on said support system to provide a biased side load substantially perpendicular to the longitudinal axis of the hard metal insert of the bit to be ground to the grinding machine during grinding to maintain alignment

of the grinding machine with the longitudinal axis of the hard metal insert to be ground.

33. A control system according to claim 32 wherein said support system has a frame and arm or lever system having a first arm section with a first end journaled on said frame for adjustment of said grinding machine normal to the longitudinal axis of the hard metal insert to be ground and wherein the means for providing a biased side load to said grinding machine consists of a cylinder having one end connected to said frame and the other end connected to said first arm section.

34. A control system according to claim 33, wherein said support system includes means for providing a balance pressure when the grinding machine is not in use and feed pressure when in use.

35. A control system according to claim 32, 33 or 34 wherein the means for holding one or more rock drill bits to be ground includes a table with one or more apertures to hold one or more rock drill bits to be ground, said table tiltably mounted within a box or frame and means to control the tilting action of said table.

36. A control system according to claim 35 wherein means are provided to lock a bit within said aperture and means to partially release the pressure to permit the bits to be rotated without full release of the locking means.

37. A control system according to any one of claims 23 to 36, wherein said programmable control card module is capable of monitoring and adjusting one or more additional operational parameters selected from the group consisting of coolant flow to the surface of the

hard metal insert, coolant flow to the electric motor, output frequency from the frequency inverter, biased side load, counter balancing pressure, bit positioning, angle of the grinding machine, speed of the rotation motor or tilting of the table or other support holding the bit

38. A control system according to any one of claims 23 to 37 wherein said programmable control card module is capable of providing error reporting, service reminders, forced replacement of worn parts, components or modules or access control.